

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Request by Progeny LMS, LLC for Waiver of)	WT Docket No. 11-49
Certain Multilateration Location and Monitoring)	
Service Rules)	

To: Chief, Wireless Telecommunications Bureau
Chief, Office of Engineering and Technology

**COMMENTS OF
THE WIRELESS INTERNET SERVICE PROVIDERS ASSOCIATION**

The Wireless Internet Service Providers Association ("WISPA"), pursuant to the February 14, 2012 *Public Notice*¹ in the above-captioned proceeding, hereby comments on the testing report ("Report") submitted by Progeny LMS, LLC ("Progeny").²

As demonstrated herein, the Report raises "significant interference concerns" because Progeny's field testing omitted consideration of certain equipment and was conducted so as to skew the results in favor of Progeny instead of being based on real-world testing conditions that may have revealed unacceptable interference to Part 15 outdoor devices in the 902-928 MHz band. Because the test process and parameters are flawed, the Commission should not permit Progeny to commence operations of its Multilateration Location and Monitoring Service ("M-LMS") unless and until it undertakes further testing that demonstrates conclusively that there would be no

¹ *Public Notice*, "The Wireless Telecommunications Bureau and the Office of Engineering and Technology Seek Comment on Progeny's M-LMS Field Testing Report," DA 12-209, re. Feb. 14, 2012 ("*Public Notice*").

² In addition to the Report, Progeny also filed a Notice of Permitted Oral Ex Parte Presentation on January 27, 2012 reporting on a meeting among Progeny's representatives and representatives of the FCC's Wireless Telecommunications Bureau ("WTB") and the Office of Engineering and Technology ("OET"). See Letter from Bruce A. Olcott, Counsel to Progeny, WT Docket No. 11-49, dated Jan. 27, 2012 ("Progeny Ex Parte Presentation").

unacceptable interference. WISPA is available to assist Progeny in further field testing that will provide better, more comprehensive data regarding the potential for Progeny's system to cause unacceptable interference to Part 15 devices operating in the 902-928 MHz band.

Introduction

WISPA is an industry trade association that represents the interests of more than 600 wireless Internet service providers ("WISPs"), vendors, system integrators and others interested in promoting the growth and delivery of fixed wireless broadband services to Americans. A majority of WISPs rely heavily on the 902-928 MHz band to deliver fixed wireless broadband services to consumers, residences, businesses, hospitals, public safety locations and educational facilities.

The 902-928 MHz band is often the preferred unlicensed band for WISPs because the propagation characteristics of the band are superior to the other available unlicensed bands. Moreover, as consumers' desire for bandwidth-intensive applications and services has increased, and as emerging industries such as automated meter reading and precision agriculture continue to occupy the 900 MHz band, WISPs have experienced greater congestion in the 900 MHz band. Accordingly, the introduction of a new licensed service in the band is of great interest and concern to WISPA and its members.

The Progeny Waiver

On December 20, 2011, the WTB and OET jointly adopted an *Order* granting Progeny a waiver of Sections 90.155(e) and 90.353(g) of the Commission's Rules.³ Notably, the Commission did not waive Section 90.353(d), which requires M-LMS users

³ *In the Matter of Request by Progeny LMS, LLC for Waiver of Certain Multilateration Location and Monitoring Service Rules*, Order, WT Docket No. 11-49, DA 11-2036, rel. Dec. 20, 2011 ("Order").

to demonstrate through field testing that operation of M-LMS systems will not cause unacceptable levels of interference to Part 15 devices.⁴ In adopting this rule, the Commission explained that “[t]he purpose of the testing condition is to insure that multilateration LMS licensees, when designing and constructing their systems, take into consideration a goal of minimizing interference to existing deployments or systems of Part 15 devices in their area, *and to verify through cooperative testing that this goal has been served.*”⁵ In recognition of this obligation, the Commission required Progeny to file a report:

that provides details on the M-LMS system (e.g., proposed transmit bandwidth, power levels and power controls, duty cycle, sharing techniques, etc.), describes the process by which it carried out the field testing, including the particular types of Part 15 devices tested, and demonstrates that its M-LMS system will not cause unacceptable levels of interference to Part 15 devices that operate in the 902-928 MHz band.⁶

The Commission stated that if “significant interference concerns are raised, we will determine what additional steps may be appropriate.”⁷ The Commission also reserved the right to require Progeny to take remedial action if its operations caused unacceptable levels of interference to Part 15 devices.⁸

On January 27, 2012, Progeny filed its Report. The Report described the system design elements that, in Progeny’s view, showed that its “network provides an optimal co-existence opportunity for the 902-928 MHz band.”⁹ Summarizing the attached field test analysis, the Report concluded that “Progeny’s M-LMS signals are not detected by

⁴ See *id.* at 10.

⁵ *Amendment of Part 90 of the Commission’s Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems*, Memorandum Opinion and Order and Further Notice of Proposed Rulemaking, 12 FCC Rcd 13942 (1997) (“*LMS MO&O*”), at 13968 (emphasis added).

⁶ *Order* at 12.

⁷ *Id.*

⁸ See *id.*

⁹ Report at 4.

most Part 15 devices operating in typical operating conditions. Even in those limited cases when Progeny's service is detected, the M-LMS signal artifact does not impede the ability of the Part 15 device to transmit voice or data communications.”¹⁰

WISPA has analyzed the Progeny Report with respect to Part 15 outdoor broadband wireless access (“BWA”) devices typically used by WISPs.¹¹ Contrary to Progeny's assertions, the Report does not demonstrate the absence of unacceptable interference to Part 15 devices because Progeny's testing considered only one BWA system (access point and end-user device) and was conducted without accounting for different equipment, network architectures and environments. Further, the Report does not indicate that Progeny engaged in the required “cooperative testing.” As the trade organization representing WISPs that operate in the 902-928 MHz band and their customers, WISPA respectfully requests that the Commission require Progeny to conduct further testing in collaboration with WISPA. This further testing must account for a broader range of realistic test conditions so that unacceptable interference from Progeny's system can be avoided before fixed wireless broadband service to consumers is permanently disrupted.

Discussion

Progeny's Report does not reflect field testing appropriate to determine whether commercial operation of its planned system would create unacceptable levels of interference to BWA devices in the 902-928 MHz band. In many significant ways, Progeny's outdoor BWA testing assumptions and parameters deviate so significantly

¹⁰ *Id.*

¹¹ Attachment 1 of the Report is the “Wide Area Positioning System Network Description.” Attachment 2 is entitled “Coexistence of M-LMS Network and Part 15 Devices” and is authored by Spectrum Management Consulting Inc. (the “Test Results”).

from real-world conditions as to make meaningless Progeny's conclusion that its M-LMS system will not cause unacceptable interference. This is glaringly apparent when all the deficiencies, test conditions and flaws of the Report are considered as a whole.

Incomplete Testing and Invalid Assumptions

In several respects, the Test Results demonstrate deficiencies in the field testing of fixed Part 15 BWA devices used by WISPs. First, of the 17 devices Progeny used in its field study, the Test Results state that Progeny tested only one BWA system, a Canopy system made by Motorola Solutions, Inc. (now known as Cambium) ("MSI").¹² MSI is just one of many manufacturers that produce and sell 900 MHz equipment for the WISP industry. Progeny itself reported that there are 303 Digital Transmission Systems certified in the Commission's database that are authorized for the 902-928 MHz band;¹³ several of these are fixed broadband wireless devices commonly used by WISPs.¹⁴ WISPs purchase this equipment every day, so Progeny's claims about the "difficulties in obtaining certain Part 15 devices"¹⁵ and its "exhaustive efforts to identify the Part 15 devices that are currently available and deployed in the market"¹⁶ are untrue with respect to BWA equipment and do not excuse Progeny's obvious lack of testing rigor. By testing only one BWA device and ignoring other commonly-deployed BWA devices, Progeny failed to consider a sufficient sample of BWA equipment to determine the extent to which WISPs may suffer unacceptable interference.

¹² See Test Results at 17; Progeny Ex Parte Presentation at 12.

¹³ See Test Results, Appendix at 3.

¹⁴ Manufacturers of BWA devices certified to operate in the 902-928 MHz and include Airspan Networks Inc., Alvarion Ltd., Tranzeo Wireless Technologies, Inc., Ubiquiti Networks, Inc. and Vecima Networks Inc.

¹⁵ Test Results at 16.

¹⁶ See Progeny's Opposition to Request to Extend the Dates for Comments and Replies, WT Docket No. 11-49, filed March 13, 2012 ("Progeny Opposition"), at 4.

Second, the Canopy equipment uses BPSK modulation that is very robust in its ability to accept interference. Progeny did not test equipment with other modulation methods that may be less able to coexist with its planned L-MLS system. Again, this is an insufficient sample and likely leads to an understatement of the level of interference that would be experienced industry-wide if Progeny commercially deploys.

Third, Progeny erroneously states that “many Part 15 devices employ automatic frequency selection capabilities”¹⁷ that enable the devices to switch to a channel that the M-LMS network is not using. Typical BWA equipment does not employ frequency hopping or automatic frequency agility as a modulation mode. In fact, as the Test Results concede, the Canopy equipment Progeny tested requires frequencies to be changed manually.¹⁸ Further, manually or automatically switching to another channel is not an option for most outdoor WISPs because the number of available 900 MHz channels is limited and other channels are typically already occupied by other WISPs.

Fourth, while Progeny states that commercial devices are “more tolerant of other signals in the band because the transmitted data can be encoded or retransmitted if necessary,”¹⁹ it fails to recognize that retransmission lowers the data rate, which unacceptably and repeatedly slows fixed broadband service to end users. Progeny also fails to acknowledge that it is not only distance that is a performance factor but also that throughput is a performance factor. Maintaining the same transmit-receive distance but lowering the throughput constitutes deterioration in the performance of Part 15 devices, to the detriment of customers and end users.

¹⁷ Report at 2.

¹⁸ See Test Results at 12; Progeny Ex Parte Presentation at 12.

¹⁹ Test Results at 12.

Non-Representative Testing Location

Progeny conducted its testing in an area conducive to creating interference-free results, not an area that represents “realistic locations for the actual use of Part 15 devices” as Progeny asserts.²⁰ As a relatively flat valley floor populated by low, height-restricted buildings, the Santa Clara Valley is not typical of most urban areas. The low building heights, low tree heights and densities and lack of terrain obstructions result in a low density of Progeny beacon transmitters. In contrast to this, in typical cities populated with “urban canyons” made up of large numbers of tall buildings, Progeny likely will require a denser deployment of base stations to deploy viable M-LMS systems, especially indoor systems. This higher base station density will lead to substantially higher interference levels into Part 15 devices.

Moreover, Progeny did not test in rural areas typical of the areas where many WISPs operate. Progeny should have tested in a number of diverse geographic areas, including areas with many man-made and natural obstructions, not just in a single area where the results are undoubtedly skewed in its favor.

Last but not least, unlicensed users may not interfere with licensed users;²¹ therefore, the more base stations that Progeny deploys, the more that WISPs and other unlicensed users will be forced to cease use of the 900 MHz band to avoid causing interference to Progeny’s ever-expanding number of licensed base stations. Progeny’s faulty test area selection can not and should not be used to support its unwarranted claim that their system “does not cause unacceptable levels of interference to Part 15 devices”

²⁰ Test Results at 23. Further, testing a single BWA device in one location does not constitute a “representative sampling . . . replicating varying conditions across the country.” Progeny Opposition at 5.

²¹ See Order at 10, citing *LMS R&O*, 12 FCC Rcd at 13968.

or to assert that operation of their licensed system will not harm the businesses and networks whose operations rely on the use of the 900 MHz band.

Non-Representative Testing Parameters

Progeny employed testing parameters that are not representative of real-world interference that BWA devices are likely to suffer from commercial operation of Progeny's M-LMS system. First, Progeny tested data throughputs of a single Canopy BWA access point and associated end-user equipment in one direction only and at the low speeds of 500 kbps, 750 kbps and 1000 kbps. WISPs provide not one-way but bi-directional throughput rates of as much as 3 Mbps using Canopy 900 MHz radio links. By testing throughput at the maximum rate of only 1 Mbps instead of 3 Mbps, any interference (i.e., slowdowns) experienced by the Canopy system would be masked and not detected because the Canopy system was only tested at one-third of its maximum data transmission rate. Further, WISPA members report that other BWA equipment provides throughput rates of up to 8 Mbps. Progeny should have tested a wider range of Part 15 devices and tested them at higher throughput rates to gain a better understanding of the potential for interference.

Second, the tested link distance of the BWA equipment was unreasonably short and failed to appropriately account for the interference potential. The interference testing between the two Canopy devices was measured at link distances of only 0.40 and 0.43 miles,²² yet according to the manufacturer, the Canopy system is capable of working at distances of up to 40 miles.²³ At the short test distances that Progeny used (i.e., only 1/100th of the maximum real-world link distance), the signal strengths between Canopy

²² See *id.* at 50; Progeny Ex Parte Presentation at 20.

²³ See Exhibit 1, copy of Canopy marketing materials.

radios would be so high as to make them almost impervious to interference from the Progeny base station. Without testing interference at greater BWA link distances, it is not surprising that Progeny's test results would fail to detect and therefore drastically understate the potential for interference.

Third, although the Progeny base station was located only 0.1 miles from the Canopy test receiver, the Canopy test link was oriented so that the Progeny base station was 90 degrees off to the side of (off axis from) the Canopy test receiver.²⁴ Therefore, any interference from the Progeny base station into the Canopy test receiver was minimized due to the off-axis physical relationship between the Canopy test receiver and the Progeny base station.²⁵ A more appropriate real-world test would have been to place the Progeny base station transmitter in front of and in-line with the Canopy receiving antenna. This is but another example of faulty procedures that bias the test outcomes against unlicensed Part 15 users and in favor of Progeny's unfounded assertion that its system does not cause unacceptable interference to Part 15 users.

Lack of "Cooperative Testing"

The *LMS MO&O* that adopted the testing requirement of Section 90.353(d) requires M-LMS licensees to "verify through cooperative testing" that the system is designed to minimize harmful interference.²⁶ Given the prevalence of WISPs operating in the 902-928 MHz band, it would appear logical that Progeny would have attempted to cooperate with WISPs or their trade association, WISPA. The Report, however, is devoid of any mention of any such cooperation. Had Progeny invited WISPA's cooperation in the testing, the Report would have been more comprehensive and would

²⁴ See Test Results at 50, Figure 11.

²⁵ This relationship is depicted in Figure 11 on page 50 of the Test Results.

²⁶ *LMS MO&O* at 13698.

have provided the Commission and the public with greater confidence in the test procedure and in the test results.

WISPA believes that further testing – this time in cooperation with WISPA and its members – can address the limitations and flaws recited above and better represent the interference environment. To the extent Progeny does not voluntarily engage in cooperative testing with WISPA, the Commission should require Progeny to do so.

Conclusion

Progeny's Report raises "significant interference concerns." It is riddled with incompleteness, poor testing parameters and flawed assumptions that collectively understate the potential for interference to outdoor Part 15 BWA devices. The Commission should require Progeny to undertake further testing – this time in a cooperative manner – to determine whether and to what extent its equipment will cause unacceptable levels of interference to Part 15 outdoor devices.

Respectfully submitted,

March 15, 2012

WIRELESS INTERNET SERVICE PROVIDERS ASSOCIATION

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MOTOROLA CANOPY™ WIRELESS BROADBAND

900 MHz Modules



PROVIDE RELIABLE BROADBAND SERVICE TO REMOTE CUSTOMERS WITH CANOPY SYSTEM 900 MHz MODULES

Service providers need to deliver reliable, high-quality broadband service at a low investment to succeed in today's competitive marketplace. Motorola's Canopy system provides carrier and enterprise network operators a robust wireless broadband portfolio of products to deliver proven cost-effective, secure, carrier-grade broadband access exactly when and where it is needed.

Existing networks cannot reach many subscribers who are willing to pay for broadband service. Motorola's Canopy 900 MHz system now provides a 3.3 Mbps signaling rate with increased **Non-Line of Sight (NLOS)** performance to reach subscribers in areas with foliage. 900 MHz modules can also be used to reach sparsely populated areas with a **Line of Sight (LOS)** performance of more than 40 miles depending on specific conditions.

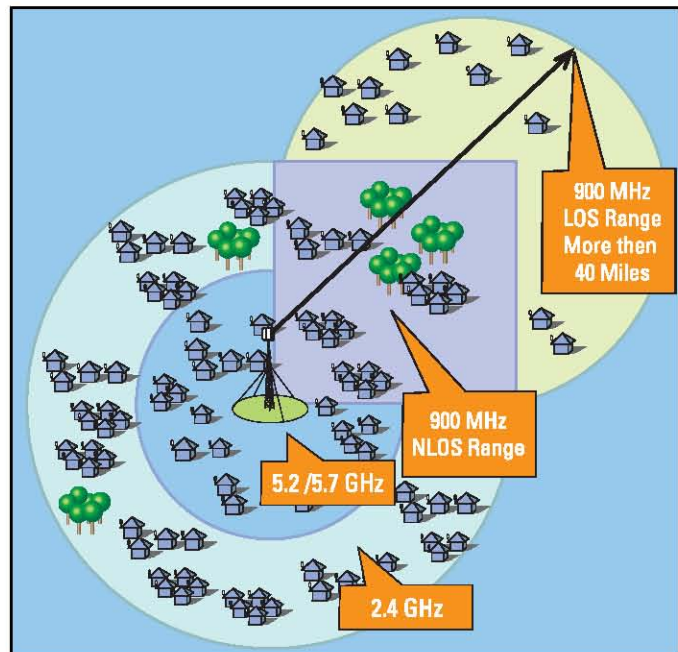
- **Carrier network operators** can enhance their customer base and revenue stream by expanding into sparsely populated or difficult to reach unserved markets hungry for broadband service.
- **Enterprise network operators** can reach remote locations at a fraction of the cost of deploying wireline broadband systems.

OVERVIEW

The Canopy platform's flexible product design allows network operators to tailor installations to efficiently meet the bandwidth demand of remote business and residential subscribers. With Canopy system modules, subscribers to the edge of the network experience secure, reliable carrier-grade service. 900 MHz modules complement existing Canopy system networks by providing a reliable 3.3 Mbps signaling rate to those customers who are not able to be reached by 2.4 GHz, 5.2 GHz and 5.7 GHz networks.

900 MHz MODULE APPLICATIONS

Add capacity in densely populated locations by deploying Canopy system 900 MHz Access Point and Subscriber Modules to complement existing 2.4 GHz, 5.2 GHz or 5.7GHz installations. Remote subscribers can be added to the network



quickly and with a minimum additional investment in equipment and labor.

Penetrate Foliage with increased NLOS performance to add subscribers in areas of foliage who are currently unreachable by current broadband wireless solutions. NLOS range is dependant on specific environmental conditions.

Reach Sparsely Populated Remote Areas with the long LOS range of the 900 MHz modules. Ranges reach more than 40 miles depending on specific conditions.

Extend the Existing Network by co-locating a 900 MHz Access Point module with an existing 2.4 GHz, 5.2 GHz or 5.7GHz SM to act as a Remote AP solution and efficiently provide coverage to areas that are difficult to reach due to foliage or other obstructions. This application is the most cost-effective means of reaching clusters of subscribers in remote areas or locations with foliage because it does not require a tower location or backhaul equipment.

900 MHZ SYSTEM BENEFITS

The Motorola Canopy system is a field-proven secure, scalable wireless broadband solution comprised of an array of modules that can be configured to meet the unique needs of service providers and enterprise network operators. The benefits of the Canopy system 900 MHz modules include the following:

- **Extend Broadband Network Coverage** to include subscribers in areas of foliage or sparsely populated remote areas.
- **Provide Secure Communications** with DES (Data Encryption Standard) encryption that provides 56-bit encryption or FIPS

197 certified AES (Advanced Encryption Standard) 128-bit encryption: the highest level of security for data communications.

- **Provide Reliable Service** by offering a consistent 3.3 Mbps signaling rate. The Canopy system's unique and powerful modulation scheme yields proven carrier-grade service and industry-leading interference tolerance.
- **Antenna Options** allow network operators to tailor the system to meet specific network and deployment requirements while leveraging the investment in equipment.

900 MHz System Features

Application	Encryption	Antenna	Signaling Rate	Range
Point-to-Multipoint	AES	Integrated	3.3 Mbps	More than 40 miles LOS depending on conditions
		External		
	DES	Integrated		
		External		

CANOPY SYSTEM ACCESS POINT MODULE 900 MHz AP AND SM

Operating Frequency Range — ISM Band	902-928 MHz
Signaling Rate	3.3 Mbps at 2-level FSK
Carrier to Interference (C/I)	< 3 dB
Receiver Sensitivity	-90 dBm
Operating Range (all weather)	More than 64 km (40 miles) depending on conditions
DC Power	0.34 A @ 24 VDC = 8.2 W
Effective Isotropic Radiated Power (EIRP)	4W EIRP
Interface	10/100 Base T, half/full duplex. Rate auto negotiated (802.3 compliant)
Protocols Used	IPV4, UDP, TCP, ICMP, Telnet, HTTP, FTP, SNMP
Encryption	AES (FIPS 197 compliant), DES standard
Modulation Type	High index binary (2-level) Frequency Shift Keying (BFSK) optimized for interference rejection
Non-overlapping channels	3 non-overlapping, 8 MHz-wide channels
Access Method	Time Division Duplexing / Time Division Multiple Access (TDD/TDMA)
Network Management	HTTP, TELNET, FTP, SNMP Version 2C
Operating Temperature	-40° C to +55° C (-40° F to +131° F)

CANOPY ACCESS POINT ANTENNA OPTIONS

Canopy system 900 MHz Access Point Modules are equipped with an integrated 60° antenna, or come designed with a standard N-Type connector to allow network operators to equip modules with either directional or omni-directional antennas to meet specific requirements.

STANDARD INTEGRATED ANTENNA

Antenna Beam Width — 60° beam width azimuth and 34° elevation ~12.5 dBi

OPTIONAL ANTENNAS

Directional — 60° beam width azimuth and elevation ~10 dBi

CANOPY ACCESS POINT FILTER OPTIONS

Motorola offers optional filters so that Canopy system 900 MHz Access Point Modules can be mounted near interference-prone environments.

For more information about how the Canopy system can extend your network and services, provide competitive advantage and outstanding ROI, call 866-515-5825 in the U.S. — 800-795-1530 internationally or visit us at www.motorola.com/canopy

